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## Improving Students' Learning Outcomes Using 5E Learning Cycle Model

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### ABSTRACTS

Quality control of agricultural products is one of the study programs in the vocational school that applies online learning during the COVID-19 pandemic. The implementation of online learning in grade XI quality control has constraints, in which the average learning outcomes are still gaining at a low value of 58.06 in the analysis proximate material. At the time of observation, 70% of students did not understand the topic. Some students get difficulties in discovering or constructing a solution to a problem. Thus, an appropriate learning model is needed to improve student's learning outcomes. The purpose of this study was to determine the implementation of the learning cycle 5E model and discovery learning also to identify the differences in student learning outcomes between both models' performance in the materials applying fresh milk quality standards. The research was conducted using the quasi-experimental (experiment classes used the learning cycle 5E model and control class used the discovery learning model). This study proved good analysis results. The application of the learning cycle 5E shows better results to the discovery learning model to improve student learning outcomes as evidenced by the fact that the average value of experiment classes is higher than that of the control class. The N-gain value of the experiment class is greater than that of the control class. Therefore, the learning cycle 5E model can improve students' learning outcomes.

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## 1. INTRODUCTION

Based on observation conducted at vocational school 1 Cibadak, Indonesia, the average test results of eleventh grade of Quality Control Study Program on proximate analysis material were rated very low at 58.09. Based on classroom observation, teachers were more likely to use discovery learning model. Discovery learning is inefficient for teaching large numbers of students, as some students get difficulties in discovering or constructing a solution to a problem. Thus, appropriate learning model is needed to effectively improve students learning outcomes.

Learning cycle 5E model has 5 stages of learning activity. It follows the paradigm of constructivism, i.e. students are considered to have initial knowledge so that it can be the basis for constructing new knowledge. Previous research has shown that 5E learning cycle model can improve cognitive learning outcomes (Pratiwi, 2016; Rodriguez et al., 2019; Utari, et al., 2013). The model can also improve problem-solving skills in students (Yeni, 2010). Research has shown that the 5E model influences students' learning outcomes and critical thinking skills (Novianti, 2014). However, there is no study on the different impact of 5E learning cycle and discovery learning to improve learning outcomes.

The purpose of this study was to determine the implementation of 5E learning cycle model and discovery learning and identify the differences in student learning outcomes between both models' performance (Jizat & Sulong, 2021).

## 2. METHODS

This research was conducted using a quasi-experimental method with an experimental class applying the 5E learning cycle model and a control class applying the discovery learning model. The pretest and posttest to determine a difference between before and after treatment. This research was conducted using a quasi-experimental method with an experimental class applying the 5E learning cycle model and a control class applying the discovery learning model. The pretest and posttest to determine a difference between before and after treatment.

## 3. RESULTS AND DISCUSSION

### 3.1. Implementation of Learning

The learning model used in the experimental class was the 5E model with two cycles. The 5E model can be implemented with one or more cycle and students were expected to internalize the concept and relate it to each of indicator (Agus et al., 2020). Learning activities in experimental class were carried out regularly based upon the syntax (Bilad, 2021) The classroom atmosphere was very active and conducive to discussion activities through WhatsApp. Therefore, the implementation of learning in experimental class resulted 94% score rated very good. Learning activities in control class were conducted using discovery learning model. Learning activities were conducted independently by students until they find the theory or conclusion (Althof & Berkowitz, 2006). Learning in the control class is carried out well and acts according to the syntax. Thus, resulting learning in the control class has a score of 94% rated very good.

### 3.2. Learning outcomes

In this study, the 5E model improved students' learning outcomes compared by control class using the discovery learning model. **Table 1** shows the result of student learning outcomes.

The 5E model has an impact on improving students' learning outcomes. Students receive positive learning experience when they have meaningful learning activities (Sari, 2014). Based on hypothesis testing, learning activities conducted in experimental class and control class resulted different learning outcomes. Compared to control classes, the 5E model is proven to show better results in improving student learning outcomes. The 5E model can improve students' learning outcomes as the cycle involves students' activity in exploring and developing the potential that has been previously owned.

The discovery learning is based on knowledge sought and discovered by each student so that high interest in learning is required. The discovery learning model is done by presenting problems related to the material studied so that students try to find solutions. However, there is often a misconception in the process because knowledge is concluded based on the results of existing observations.

#### 4. CONCLUSION

The implementation of learning in both classes is excellent and active in discussions. Based on hypothesis testing, there are differences in student learning outcomes using the 5E learning cycle model compared to discovery learning. The average N-gain value in the experiment class is greater than the control class. This study proves that the 5E learning cycle model can improve students' learning outcomes.

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**Table 1.** Students' learning outcomes.

Value scale	Pretest				Posttest			
	Experiment		Control		Experiment		Control	
	Total Students	%	Total Students	%	Total Students	%	Total Students	%
17-28	0	0	1	4	0	0	0	0
29-40	0	0	0	0	0	0	0	0
41-52	3	12	2	8	0	0	0	0
53-64	3	12	7	28	0	1	4	4
65-76	13	52	8	32	3	12	9	36
77-88	5	20	6	24	9	36	7	28
89-100	1	4	1	4	13	52	8	32
<b>Total</b>	25	100	25	100	25	100	25	100
<b>Passed</b>	6	24	7	28	22	88	15	60
<b>Failed</b>	19	76	18	72	3	12	10	40
<b>Average</b>	69		67		89		83	
<b>Sig 2-tailed</b>	0.646				0.040			
<b>N-gain</b>	Experimental class				Control class			
<b>Category</b>	High				Moderate			

## 6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

## 7. REFERENCES

- Agus, P., Nur, A., Syamsul, H., and Nita, A. (2020). The effects of the ECIRR learning model on mathematical reasoning ability in the curriculum perspective 2013: Integration on student learning motivation. *European Journal of Educational Research*, 9(2), 675-684.
- Althof, W., and Berkowitz, M. W. (2006). Moral education and character education: Their relationship and roles in citizenship education. *Journal of Moral Education*, 35(4), 495-518.
- Bilad, M. R. (2021). Portfolio workbook as an effective method for student-centered learning of chemical engineering principles. *ASEAN Journal of Science and Engineering Education*, 1(1), 31-36.
- Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, 66(1), 64-74.
- Jizat, N. A. M., and Sulong, M. S. (2021). Lecturer Perspective on Informal Learning Activities. *Indonesian Journal of Educational Research and Technology*, 1(1), 23-26.
- Novianti, A. (2014). Pengaruh model pembelajaran learning cycle terhadap keterampilan berpikir kritis siswa. *Edusains*, 6(1), 109-116.
- Pratiwi, D. D. (2016). Pembelajaran learning cycle 5E berbantuan geogebra terhadap kemampuan pemahaman konsep matematis. *Al-Jabar: Jurnal Pendidikan Matematika*, 7(2), 191-202.
- Rodriguez, S., Allen, K., Harron, J., and Qadri, S. A. (2019). Making and the 5E learning cycle. *The Science Teacher*, 86(5), 48-55.
- Sari, A. K. (2014). Analisis karakteristik gaya belajar vak (visual, auditorial, kinestetik) mahasiswa pendidikan informatika angkatan 2014. *Edutic-Scientific Journal of Informatics Education*, 1(1). 1-12.
- Utari, S., Feranie, S., Aviyanti, L., Sari, I. M., and Hasanah, L. (2013). Application of learning cycle 5e model aided Cmaptools-based media prototype to improve student cognitive learning outcomes. *Applied Physics Research*, 5(4), 69.
- Yeni, N., Suryabayu, E. P., and Handayani, T. (2017). The effect of teaching model 'learning cycles 5E'toward students' achievement in learning mathematic at X years class SMA Negeri 1 Banuhampu 2013/2014 Academic Year. *Journal of Physics: Conference Series*, 812(1), 012107.